

# DE 40 39 269 C1

## Description

The present invention is related to a self-closing fuel tank closure for fastening on a fuel filler neck, with the features of the preamble of claim 1.

In known self-closing fuel tank closures of this kind, (compare DE-PS 34 06 788 – Fig. 3; 36 02 844; DE-OS 37 21 049) the closing mechanism having the closing spring is realised such that the valve body, formed as a pivotal flap, is on the one hand pressed into the sealing seat by the closing spring with a high force; but on the other hand, the closing spring is only compressed slightly in the course of the opening movement, and therefore, the force one has to exert for opening is small in this phase.

Thus, in the beginning of the opening operation, a correspondingly great force must be exerted on the valve body via the fuel pump nozzle at first, wherein one has to take care that this force is exerted only for a short time, if one wants to avoid that the fuel pump nozzle suddenly dips into the fuel filler neck.

In case of a valve body that is movable against the action of a closing spring (DE-PS 34 06 788 – Fig. 1), the opening action may be performed more smoothly in fact; however, unauthorized persons can manipulate on the fuel tank closure more easily.

The present invention is based on the objective to provide a self-closing fuel tank closure in a realisation corresponding to the preamble of claim 1, which is distinguished by a high convenience of operation on the one hand, and provides security against unauthorised opening on the other hand.

This objective is achieved by the characteristic features of claim 1.

The locking device provided according to the present invention permits to design the closing spring such that the valve body can be brought into the opening position without

noticeable expense of force or smoothly, respectively, because the locking of the valve body into its closing position that is given when the fuel pump nozzle is drawn out of the closure head ensures a fixation on the sealing seat which is safe against unauthorised use in particular.

Advantageous embodiments of the present invention are the subject matter of the subclaims.

In the drawing, an example of the realisation of the present invention is shown.

Fig. 1 shows a longitudinal section of a self-closing fuel tank closure,

Fig. 2 shows a front view of the locking device that is adapted to be inserted into the closure head.

In Fig. 1, a self-closing fuel tank closure set on a pipe-shaped filling neck 10 of a fuel tank, indicated in broken lines, is designated by 12 as a whole.

The filling neck 10 is turned up towards the inside on its free end, wherein the inside-turned neck border piece 10' forms axial ramps in the interior of the fuel filling neck in a known manner, onto which the locking noses of a tank cap usually run up in order to sealingly tension the same on the open neck end.

In the same way, the inside-turned neck border piece 10' serves for holding the self-closing fuel tank closure 12. The same has a closure head 14, which grips into the neck opening 18 defined by the inside-turned neck border piece 10' with a cylindrical shoulder 16 and is supported on the neck border piece 10' in a suitable manner. In this, the closure head 14 rests with a sealing ring 19 on the filling neck 10.

The front wall 20 of the cylindrical shoulder 16 has a central fill opening 22, which is automatically kept closed by a valve body, for instance in the form of a closure flap 24.

For this purpose, the closure flap 24 is pivotal into its opened position around a swivelling axis 26 provided on the outer side of the front wall of the shoulder 26 against the action of a closing spring 28.

In order to achieve a tight closure of the fill opening 22, the same forms a sealing seat, on which a sealing ring 30 arranged on the closure flap 24 rests when the latter is in its closed position.

Within the closure head 14, a locking device designated with 34 as a whole is provided, situated before the closure flap 24 in the insertion direction of a fuel pump nozzle pipe 32 indicated in broken lines, with the aid of which the closure flap 24 is automatically lockable in its closing position.

The locking device 34 has for instance three locking elements 36, 38 and 40, arranged at equal angular distances from each other (see Fig. 2), which are formed by flat springs 42 which extend slantly towards the inside in the direction to the central filling opening 22 of the closure head 14.

With their one end piece, the flat springs 42 are preferably fastened on the inside circumference of a supporting ring 44 forming a spreader ring, which is forced into an inner accommodation groove 46 of the closure head which is concentric to the filling opening 22.

The free end piece of the flat springs 42 is V-like bent, wherein the V-tip 48 points into the direction of the longitudinal axis 50 of the closure head 14.

The end piece of the V-leg 52 neighbouring the closure flap 24 forms a hook 54 that is formed by bending towards the outside, which in the closed position of the closure flap 24 grips over the flap end piece 24' of the closure flap 24, situated within the closure head 24, and into an outer circumferential groove 56 of the same.

In the shown engagement position, the V-tips 48 are located on a circle 57 denoted in

broken lines in Fig. 2, whose diameter is substantially smaller than the outer diameter of the fuel pump nozzle pipe 32 that is to be introduced into the closure head 14 or the filling opening 22 thereof, respectively, and is also indicated by a circle denoted in broken lines in Fig. 2.

As a consequence, in the course of the introduction of the fuel pump nozzle pipe 32 into the closure head 14, before the pipe front end thereof hits the closure flap 24, the V-shaped flat spring end pieces slip onto the pipe surface, by which the flat springs 42 are pressed towards the outside, and in doing so their hooks 54 leave the engagement with the closure flap 24.

When the pipe 32 of the fuel pump nozzle hits the closure flap 24 in the further course of the introduction, the latter releases the filling opening 22, so that the fuel pump nozzle pipe 32 can be pushed further into the same.

When the fuel pump nozzle pipe 32 is pulled out, the closure flap 24 will take on its shown closed position before the V-shaped end pieces of the flat springs 42 slip off from the fuel pump nozzle pipe 32. Through this, it is made sure that the hook 54 of each flat spring end piece safely engages the circumferential groove 56 of the closure flap 24 in the sliding, so that the latter is reliably locked in its closed position again.

In this, the locking elements 36, 38 and 40 and the closure flap 24 are constructionally matched such that the closing force is generated by the locking elements 36, 38 and 40 in a prevailing amount.

For this purpose, the groove wall 62 of the closure flap's circumferential groove 56 facing the locking device 34 takes on such a slanting position that the closure flap 24 is permanently pulled against its sealing seat at the same time under the action of the spring restoring forces which put the flat springs 42 back towards the inside. For this reason, the circumference groove 56 has preferably a V-shaped cross section.

Through this, it is sufficient to dimension the closing spring 78 relatively softly, so that the

closure flap 24 can be swivelled into its opened position without great expense of force.

60 denotes a supporting plate integrated into the closure head 14, for supporting the fuel pump nozzle inserted therein.

In the emergency case, a pressure relief valve 64 built in into the closure flap 24 provides for fast pressure reduction in the fuel tank.

Claims:

1. A self-closing fuel tank closure for fastening on a fuel filler neck, with a closure head having a sealing seat, which has a valve body, biased in the direction towards the sealing seat by a closing spring and movable into an opened position against the force of the closing spring when a fuel pump nozzle pipe is introduced into the closing head, characterised by a locking device (34) automatically fixing the valve body (closure flap 24) on the sealing seat (fill opening 22) and being adapted to be actuated by the fuel pump nozzle pipe (32) upon introduction into the closure head (14) in order to unlock the valve body (closure flap 24).
2. A fuel tank closure according to claim 1, characterised in that the locking device (34) has at least two locking elements (36, 38 or 36, 40) disposed opposite to each other inside the closure head (14) and automatically moving radially into their locking position, which each have a section (48) sliding onto the fuel pump nozzle pipe (32) in order to release the valve body (closure flap 24).
3. A fuel tank closure according to claim 2, characterised in that the locking elements (36, 38, 40) are formed by flexion springs (flat springs 42), extending into the direction of the valve body (closure flap 24) and fastened on a common supporting ring (44) that is inserted into the closure head (14) concentrically to the sealing seat (fill opening 22) thereof, whose free spring end is hook-like bent, and that in the closing position of the valve body (closure flap 24), after sliding off from the fuel pump nozzle pipe (32), the flexion springs (flat springs 42) engage into a perimeter recess (perimeter groove 56) that is formed in the valve body end piece (24') which faces the flexion springs (flat springs 42).
4. A fuel tank closure according to claim 3, characterised in that the flexion springs formed by flat springs (42) slantly project from the supporting ring (44) towards the inside in the direction of the sealing seat (fill opening 22) and that the free end piece thereof is bent in a V-shape, wherein the V-tip (48) of the V-shaped portion forms the

section of the locking elements (36, 38, 40) sliding onto the fuel pump nozzle pipe (22), and that the free end piece (54) of the V-leg (52) turned away from the supporting ring (44) is hook-like bent towards the outside.

5. A fuel tank closure according to any one of the preceding claims 2 to 4, characterised in that the section (48) of the locking elements (36, 38, 40) sliding onto the fuel pump nozzle pipe (32) slides off from the same after the valve body (closure flap 24) has taken on its closing position.

1 page of drawings is related to this.

Abstract

It is dealt with a self-closing fuel tank closure for fastening on a fuel filler neck. It has a filling opening that is closable by way of a valve body. The valve body is movable into its opened position by way of a fuel pump nozzle pipe against the action of a closing spring. A locking device is associated to the valve body, which fixes the same automatically in its closed position, and is adapted to be actuated automatically by the fuel pump nozzle pipe upon introduction into the closure head.